EOSDIS IV&V
Monthly Program Status Report
For the Period 8/1/94 to 8/31/94

Submitted

September 15, 1994

INTERMETRICS
6301 Ivy Lane
Greenbelt, MD 20770

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SUBMITTED BY:

Ron Cariola
Program Manager

Date

ACCEPTED BY:

Joe Gitelman
NASA EOSDIS IV&V Project Manager

Date

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PREPARED BY:

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1. PROGRAMMATIC INFORMATION

1.1 IV&V Project Organization Chart

Exhibit 1-1 illustrates the current organizational structure of the EOSDIS IV&V team. For each lead position, we have identified company affiliation, geographic location, phone number, and task assignment. Also included is the number of full time equivalent engineers assigned to each technical task.

1.2 Overview of Work Being Performed

a) List of Active Task Assignments

- Task 1: IV&V Program Management
- Task 2: Facilities, Operations, and Program Reporting
- Task 3: IV&V Plans
- Task 4: IV&V Infrastructure and Tool Development
- Task 5: Requirements Analysis and Traceability
- Task 9: Key Interface Analysis
- Task 10: Development of EOSDIS Integration and Certification Plan

b) Key Recent Accomplishments

- **Programmatic**

  - Reassessed program cost estimates to account for budgetary constraints.

  - Reviewed existing task Statements of Work (SOWs) and compared them with new budgetary constraints. Providing inputs to revise SOWs so that they reflect changing program needs.

  - Providing inputs to new task SOW for IV&V support of the EDOS program.

  - Coordinated with Daphne Rodriguez of GSFC to add the IV&V team to the distribution list for receiving Hughes ECS documents.

  - Coordinating with Dan McKernan from NASA Ames, CA, to elevate the priority for establishing a T1 link between the Greenbelt office and GSFC. Providing McKernan with justification for T1 line and determining associated costs.

Exhibit 1-1: Org Chart (Landscape)

- Continued coordinating activities with NASA/WVU to enhance IV&V processes under the collaborative environment program at the IV&V facility at Fairmont, WV. In the process of drafting a MOU between the two organizations which should be finalized in the early October.

- Arranged for additional temporary space within the Greenbelt office complex to provide for staff increases until permanent space is ready for occupancy.

• **Technical**

- Under Task 3, delivered the EOSDIS IV&V Management Plan (IVVMP) to NASA, and currently working on the Independent System V&V Plan (ISVVP).

- Under Task 4, delivered the Integrated Support Environment (ISE) draft requirements document to NASA, and began tailoring the Lotus Notes Groupware application for future contract use.

- Under Task 5, participated in technical interchange meeting with RTM consultant to discuss database structures and protocols for RTM tool usage. Also, met with key people to discuss the role of IV&V in science user satisfaction and EOSDIS modeling assessment.

- Under Task 9, developed proposed approach for assessing V0 performance, and continued detailed analysis of the TRMM IRD.

- Under Task 10, reviewed a revised draft of the EOSDIS Integration and Certification Definition Document (EICDD), and prepared outline for the Certification Criteria Determination Report.

c) New/Proposed Task Assignments

• **EDOS IV&V Task -** The IV&V of the EDOS system should begin as soon after EDOS contract startup as possible. This will provide the most cost-effective IV&V analysis and ensure early synchronization with other EOSDIS system elements.

d) Follow-up on Action Items from 8/15/94 PSR

1) Meet with Steve Wharton, the NASA EOSDIS Project Scientist, for information on science user interfaces. **Action:** *Frank Rockwell, Intermetrics*
Status: Meeting planned for September 1994.

2) Adjust EOSDIS IV&V milestones and activities to reflect changes in ETS program.
Action: *Joe Gitelman, NASA / Ron Cariola, Intermetrics*

Status: Since ETS interacts heavily with EDOS, the requirements for EDOS must first be stabilized before IV&V activities related to ETS can be adjusted. Once EDOS is fully defined, IV&V milestones and activities will be appropriately changed.

3) Consider conducting a Criticality Analysis and Risk Assessment (CARA) for the entire EOSDIS program to determine future tasks. **Action:** *Joe Gitelman, NASA / Ron Cariola, Intermetrics*
Status: To address this need, a CARA will be conducted as part of each IRVVP (i.e., at each system release).

4) When reviewing Interface Requirements Documents (IRDs), be sure to contact the government lead. Specifically, contact Ted Ackerson for discussion on TRMM IRD. **Action:** *Roland Weiss, CTA*
Status: Obtained a list of government leads for each IRD. Designated specific team members as primary interfaces for each lead. Also, contacted Ted Ackerson on 9/9/94 to discuss the baselining status of the TRMM IRD and to review progress and schedule status.

5) Contact Booz Allen to set up read/access to the ECOM Level 3 requirements. **Action:** *Frank Rockwell, Intermetrics*
Status: Contacted Paul Sullivan of Booz Allen. Clarified our team's need for access to ECOM Level 3 data and agreed on a plan to obtain this access.

6) Emphasize the importance of Intermetrics' subcontractors to submit their 533 reports to the Government on time. **Action:** *Pam McLaughlin, Intermetrics*
Status: Accomplished, both verbally and in writing to all subcontractors.

1.3 Overview of Schedule Status

Exhibit 1-2 presents the latest (i.e., dated 9/9/94), high level milestone chart for all technical tasks assigned on the EOSDIS IV&V contract. In conjunction with this exhibit, Exhibit 1-3 lists in chronological order all deliverables/milestones associated with the contract and the status of each.

Exhibit 1-2: Gitelman Milestone Chart (Landscape Paste-up)

Date Due	Milestone/ Deliverable	Task #	Status*	Comments
7/8/94	ECS Release A SDR IV&V RIDs	5	C	Accomplished within 17 days of contract award.
7/8/94	SDR IRD RID Package	9	C	Accomplished within 17 days of contract award.
7/15/94	M1 Requirements and Architecture	4	C	Submitted on time.
8/16/94	IV&V Management Plan - Draft	3	C	Submitted ahead of schedule.
8/16/94	M1 Initial Tool Architecture Review	4	C	Conducted ahead of schedule.
8/30/94	ISE System Requirements - Draft	4	C	Submitted on time.
10/17/94	ISVVP - Initial	3	IP	Writing assignments given.
10/17/94	Certification Criteria Determination Report - Initial	10	IP	Outline being developed.
10/18/94	M1 Demonstration	4	IP	
10/28/94	Preliminary ECS Rqts Analysis Report	5	IP	
10/31/94	ISE System Requirements - Update	4	IP	
10/31/94	Version 0 User Assessment	9	IP	
12/1/94	ECS-TRMM IRD Pilot TAR	9	IP	Temporarily on hold due to V0 work and delay in IRD baselining.
12/16/94	IV&V Management Plan - Final	3	IP	
12/16/94	ISVVP - Update	3	O	
12/16/94	ISE System Architecture - Draft	4	O	
12/16/94	ECS Release A PDR IV&V RIDs	5	O	
12/16/94	Performance Dependency Analysis Tool Requirements	10	O	
12/16/94	EICP - Initial	10	O	
12/30/94	Initial ARDB	5	O	
12/30/94	EOSDIS Modeling Assessment Report	5	O	
1/16/95	ISE System Architecture Review	4	O	
1/16/95	ESC Release A PDR RIDs	9	O	
1/31/95	ISE System Architecture - Update	4	O	
1/31/95	ISE Development Plan - Draft	4	O	
2/16/95	M1 Revision 2 Demo	4	O	
2/28/95	ISE Development Plan - Final	4	O	
3/1/95	Initial ARDB for IRD Requirements	9	O	
3/16/95	ECS Interim Rel 1 Rqts Analysis Report	5	O	
3/16/95	ISE Element Requirements - Draft	4	O	
3/16/95	EICP - Interim	10	O	

* C = Completed, IP = In Process, O = Open, D = Delayed, CX = Canceled

EXHIBIT 1-3: Status of Milestones/Deliverables

Date Due	Milestone/ Deliverable	Task #	Status*	Comments
4/17/95	ISE Element Requirements - Update	4	O	
5/16/95	ISE Element Software Design - Draft	4	O	
5/31/95	ISE System Design Review	4	O	
6/15/95	Certification Criteria Determination Report - Update	10	O	
6/15/95	EICP - Final	10	O	
9/30/95	Draft Release IR-1 Test Plans and Test Procedures	11	O	
12/30/95	Final Release IR-1 Test Plans and Test Procedures	11	O	
6/1/96	Initial Release A Test Plans and Test Procedures	11	O	
ETS CDR + 2 weeks	ETS CDR RIDs	5	O	
Release A CDR + 2 weeks	ECS Release A CDR IV&V RIDs	5	O	
As Completed	Release IR-1 Test Reports	11	O	

* C = Completed, IP = In Process, O = Open, D = Delayed, CX = Canceled

EXHIBIT 1-3: Status of Milestones/Deliverables (Continued)

1.4 Performance Assurance Activities/Issues

- Initial training in Object Oriented Technology (OOT) was conducted on August 30, 1994 by the Software Productivity Consortium. Additional training is being planned in this area to allow the engineers on the IV&V team to have firsthand insight into the methodology being used by the system prime (HAIS).

- A consultant from Marconi and members of our team discussed the database structures needed for the Requirements Traceability Management (RTM) tool, which will be used to support the analysis tasks (i.e., Tasks 5 and 9). Formal training on the RTM tool itself is pending Government approval.

- Training on Lotus Notes is currently being arranged. This groupware will be an integral part of the IV&V tool suite, used to facilitate cross-group communications, the IV&V document library, the E-mail utility, the hardware/software accounting system, as well as other functions.

- IV&V document review/control procedures are currently being established. In addition, the electronic card catalog for the IV&V library is currently being implemented.

1.5 Major Short Term Activities Planned

- **Office Operations**

  - Move the Greenbelt office to permanent quarters on second floor.

- **Reallocation of Personnel**

  - Consider reallocating personnel from Task 4 (IV&V tools and infrastructure) to support the V0 performance activity. Currently, Task 9 (interface analysis) personnel are supporting this effort, with an initial deliver date of 10/31/94. After that time, the interface analysis activity of Task 9 will increase and personnel availability will be limited. In contrast, some Task 4 personnel may be available, since the IV&V tool selection process is dependent somewhat on the system prime's tool selections which have not been fully determined as yet.

- **Communications**

  - Establish fast-link WAN communications between the IV&V team offices in Greenbelt and Fairmont.

  - Establish interfaces and data access privileges between the IV&V team and Goddard, Hughes, TRW, CSC, and the Software IV&V Facility in West Virginia. Get on appropriate distribution lists.

  - Develop a library of all IV&V document deliverables and provide on-line access to interested parties.

- **Technical Performance**

  - For Task 3, produce first draft of the ISVVP as well as a detailed draft of the Tool Management Plan appendix to the IVVMP by late September.

  - For Task 4, conduct M1 demonstration at Greenbelt office on 10/18/94.

  - For Task 5, prepare the EOSDIS modeling assessment plan and present it to the ESDIS Project. Also, begin requirements traceability analysis for Levels 2 - 4 using RTM.

- For Task 9, continue developing detailed approach for assessing Version 0 performance, and continue TRMM requirements analysis and interface analysis.

- For Task 10, initiate development of the EOSDIS Integration and Certification Plan (EICP), and produce first draft of the Certification Criteria Determination Report.

1.6 Key Long Range Plans/Schedules

The IV&V team will support the activities and milestones identified in Exhibit 1-2. Emphasis will be placed on those activities that are on the critical path to support the on-time launch of the spacecraft. Such activities include Key Interface and Integration Testing (KIIT) and System Certification.

2. TECHNICAL INFORMATION

2.1 Task # 3: Independent Verification and Validation Plans

a) Task Accomplishments

- Delivered the EOSDIS IV&V Management Plan (IVVMP).
- Provided a summary briefing of the IVVMP at the 8/15/94 PSR.
- Developed a detailed work plan and schedule for the Independent System V&V Plan (ISVVP). This plan focuses on distributing the writing assignments for the ISVVP broadly across the IV&V work force. Made assignments and tracked progress of ISVVP section inputs.
- Provided inputs to revised task SOW and CTRs in response to budgetary redirection.
- Supported technical interchange meetings.

b) Issues/Concerns

- Limited personnel resources have compelled us to use a widely distributed work team to draft the ISVVP. Unfortunately, without a core group of writers, we will need to expend additional effort during document integration to ensure consistency and accuracy. Also, we may not have sufficient resources to produce the multiple Independent Release V&V Plans (IRVVPs) that will be needed in early CY95. For this reason, it would be beneficial to add more personnel to this task.

c) Subcontractor Performance

- CTA performed well by providing comments to the IVVMP during the document preparation process.

d) Planned Activities

- Produce a first draft of the ISVVP in late September.
- Produce a detailed draft of the Tool Management Plan appendix to the IVVMP in late September.
- Support program briefings as required.

2.2 Task # 4: IV&V Infrastructure and Tool Development

a) Task Accomplishments

- Produced and delivered the Integrated Support Environment (ISE) draft requirements document to NASA on schedule.

- Presented the status of IV&V tools selection and conducted a review of the M1 architecture at the 8/15/94 PSR.

- Implemented Lotus Notes groupware in Fairmont. Also performed an internal demonstration of and user orientation to Lotus Notes. This software will be used to facilitate cross-group communications, the IV&V document library, the E-mail utility, the hardware/software accounting system, and other functions.

- Implemented a Novell LAN at Greenbelt and Fairmont. Also, established Internet connectivity at both locations.

- Installed the RTM tool in Greenbelt and participated in a 2-day technical interchange meeting with Marconi, the tool developer/vendor.

- In support of tool evaluations, contacted numerous tool vendors to acquire information as well as software evaluation copies.

- Provided inputs to revised task SOW and CTRs in response to budgetary redirection.

b) Issues/Concerns

- The IV&V system architecture was not originally designed to support an EOSDIS program-wide discrepancy tracking system. Therefore, changes to the architecture may be required in order to support this new requirement. IV&V team members are currently gathering requirements to assess the impact and will be making recommendations.

- Various Task Leads have begun using analysis tools which may not be fully compatible with the anticipated ISE. To alleviate this concern, we are currently defining a migration strategy which will ensure that the data resulting from the use of these tools can be migrated to the ISE at a later date.

- Since the ECS system prime has not fully selected its tool suite, we have delayed the final selection of our tool environment so that it can be made compatible with that of the system prime.

c) Subcontractor Performance

- CTA performed well in analyzing the ISE requirements and in identifying options for tool solutions.

- EWA performed well in supporting the Fairmont system administration function and in identifying M1 tool solutions.

d) Planned Activities

- Prepare for the 10/18/94 M1 demonstration to be given at the IV&V Greenbelt office.

- Develop a user interface for the Requirements Analysis task (Task 5) and the Key Interface Analysis task (Task 9).

- Continue tool evaluations.

- Continue with ISE requirements analysis to support the next delivery of the ISE requirements.

- Investigate the utility of Mosaic (an Internet browser) as a common interface into the ISE by non EOSDIS IV&V personnel.

- Support program briefings as required.

2.3 Task # 5: Requirements Analysis and Traceability

a) Task Accomplishments

- Presented task status at the 8/15/94 PSR.

- Participated in a 2-day technical interchange meeting with Marconi, the RTM tool developer/vendor. The purpose of this meeting was to discuss appropriate database structures and protocols before using the tool for task accomplishment.

- Continued the analysis of Level 3 technical integrity requirements. See Appendix 5A for a progress summary.

- Continued monitoring the ETS program. Activities included reviewing documents and attending regularly scheduled meetings.

- Met with Mike King (EOS Project Scientist) to discuss the role of IV&V in science user satisfaction.

- Met with key people to discuss the IV&V role in EOSDIS modeling assessment. These included Dr. Ramapriyan and Ms. Gail McConaughy of NASA, and Dr. Bruce Barkstrom, the CERES PI and Ad Hoc Working Group for Production (AHWGP) lead at LaRC.

- Provided inputs to revised task SOW and CTRs in response to budgetary redirection.

b) Issues/Concerns

- None.

c) Subcontractor Performance

- Subcontractor performance from CTA and SMSRC has been excellent.

d) Planned Activities

- Meet with Steve Wharton (EOSDIS Project Scientist) to discuss IV&V role in EOSDIS Modeling assessment.

- Prepare and present the EOSDIS modeling assessment plan to the ESDIS Project.

- Receive formal RTM database training from Marconi.

- Import the ECS RTM requirements database (Levels 2 - 4) into the IV&V RTM database and begin requirements traceability analysis.

- Support program briefings as required.

2.4 Task # 9: Key Interface Analysis and Test

a) Task Accomplishments

- Staffing
  - Conducted extensive recruiting activities including interviews, attendance at job fairs, etc. Continued staff familiarization with applicable documentation.

- Version 0
  - Reviewed V0 documentation.
  - Established contact with STX and began system familiarization.
  - Identified candidate areas for assessment including user interface, integrity of search results, data product requests, documentation, and system performance. Also identified various assessment approaches.
  - Met with David Han and Greg Hunolt who told us to focus on performance issues and use the knowledge we gain to develop lessons learned for ECS. Also told that the schedule has flexibility.
  - Developed proposed approach for assessing V0 performance, identifying variables and desired data (See Appendix 9A). Began making contacts to determine if desired performance data will be available.

- TRMM
  - Continued detailed analysis of the TRMM IRD. Requirements analysis is progressing, but we will not do traceability until the RTM tool is available. Interface analysis is 50% complete. We have also completed analysis of internal functional consistency and completeness, and are starting on performance analysis. In addition, TSDIS functional comparisons are being completed. Awaiting SPDF documentation which is under major revision. (This pilot analysis is proving an excellent way to refine our analysis approach.)
  - Continued drafting the TAR. This activity will temporarily be put on hold due to V0 work and the delay in the baselining of the IRD.

- Miscellaneous
  - Provided inputs to revised task SOW and CTRs in response to budgetary redirection.

b) Issues/Concerns

- We need to obtain interface and other documentation as drafts are complete (e.g., Ground System Architecture Diagram, ADD). The IV&V team has already arranged to be added to the HAIS document distribution list. Need to identify other relevant distribution lists for inclusion as well.

- The V0 performance study which we are tasked to do may require an X-terminal that can talk to multiple hosts. Currently, Intermetrics can not provide two-way X-Terminal communication without violating its network protocols. Therefore, we may need to identify an accessible terminal at GSFC or elsewhere for future use. Accordingly, we met with Greg Hunolt on 9/2/94 and requested X-Terminal access. The issue is being pursued.

- We are unclear as to the data which is available for assessing V0 performance. To determine the available data, we are currently contacting the DAAC managers.

c) Subcontractor Performance

- CTA is the task lead for this effort. Their performance has been excellent.

d) Planned Activities

- Staffing
  - Continue recruiting activities. New employee to start 9/1/94. Two additional staff to start in January 1995.

- Version 0
  - Continue developing detailed approach for assessing Version 0 performance. This approach will be reviewed by Greg Hunolt in early September.
  - Time/Resources will not permit us to provide a complete assessment in all areas. Therefore, we will give quantitative feedback in the performance area only; more subjective, opportunistic feedback will be given in other areas.

- TRMM
  - Continue TRMM requirements analysis and interface analysis.

- Analysis of Other Key Interfaces
  - Begin requirements analysis of other key interfaces in late fall. Start interface/data flow analysis in January 1995.

- Meeting Support
  - Support program meetings and briefings as required.

2.5 Task # 10: Development of EOSDIS Certification Plan

a) Task Accomplishments

- Supported the weekly Ground System Interface Working Group Meeting.

- Reviewed and commented on the revised draft of the EOSDIS Integration and Certification Plan which will henceforth be known as the EOSDIS Integration and Certification Definition Document (EICDD).

- Attended technical interchange meetings on ETS requirements.

- Prepared outline for Certification Criteria Determination Report.

- Held Intermetrics/CTA technical interchange meetings concerning the process for determining EOSDIS certification criteria.

- Provided inputs to revised task SOW and CTRs in response to budgetary redirection.

b) Issues/Concerns

- In order to maintain the task schedule, an immediate need exists for at least two full-time equivalent people. Specifically, we need one lead person to prepare the Certification Criteria Determination Report draft which is due on 10/15/94, and another to support ongoing activities. To address this issue, we have extended an employment offer to one leading candidate and are attempting to multi-task our existing personnel.

c) Subcontractor Performance

- CTA has been very responsive in supporting this task. For example, they supplied technical details concerning EOSDIS terms and definitions. They also provided a technical note on the overall EOSDIS certification process and drafted specific guidelines for determining certification criteria.

d) Planned Activities

- Produce a first draft of the Certification Criteria Determination Report in late September.

- Initiate the development of the EOSDIS Integration and Certification Plan (EICP) in mid-September.

- Support program briefings as required.

SECTION 2
APPENDICES

APPENDIX 5A

Progress Summary of
Level 3 Technical Integrity Requirements

APPENDIX 9A

Proposed Approach to
Version 0
System Performance Assessment

3. FINANCIAL/CONTRACTUAL INFORMATION

Section 3 of This Report

Has Been Removed

Due to Proprietary Content.